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CANADA-ONTARIO AGREEMENT
RESPECTING
GREAT LAKES WATER QUALITY

ANNUAL REPORT

1984-1985

Board of Review

Canada-Ontario Agreement Respecting Great Lakes Water Quality

L'Accord Canada-Ontario relatif à la qualité de l'eau dans les Grands Lacs



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LETTER TO MEMBERS

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CANADA-ONTARIO AGREEMENT

RESPECTING

GREAT LAKES WATER QUALITY

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Board of Review


Canada-Ontario Agreement Respecting Great Lakes Water Quality

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LETTER OF TRANSMITTAL

November 1985

The Honourable Tom McMillan
Minister, Environment Canada

The Honourable James Bradley
Minister, Ontario Ministry of the Environment

The Honourable Tom Siddon
Minister, Fisheries and Oceans

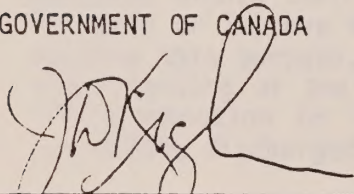
The Honourable Vincent Kerrio
Minister, Ontario Ministry of Natural Resources

The Honourable David Peterson
Premier of Ontario and
Minister, Ontario Ministry of Intergovernmental Affairs

Gentlemen:

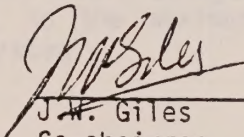
In accordance with Section 2.(v) of Schedule F of the Canada-Ontario Agreement Respecting Great Lakes Water Quality, signed on July 12, 1982, we submit herewith the Annual Report under this Agreement for the fiscal year 1984/85.

GOVERNMENT OF CANADA



J.D. Kingham
Co-chairman
Environment Canada

PROVINCE OF ONTARIO



J.W. Giles
Co-chairman
Ontario Ministry of the Environment

Canada-Ontario Agreement Respecting Great Lakes Water Quality

L'Accord Canada-Ontario relatif à la qualité de l'eau dans les Grands Lacs

1.0 INTRODUCTION

Shared responsibilities for environmental quality in Canada between the two senior levels of government call for intense cooperative efforts. Programs must be delivered in a well-integrated and fully cooperative fashion to minimize over-all government expenditures whilst maximizing the effective delivery of Federal and Provincial environmental quality programs. To provide for a well coordinated effort in the Great Lakes area, Canada and Ontario have concluded a federal-provincial agreement respecting Great Lakes Water Quality.

1.1 The Agreement

The Canada-Ontario Agreement respecting Great Lakes Water Quality (COA) signed on July 12, 1982 replaces the Canada-Ontario Agreement of March 12, 1976. It was again revised to reflect the Canada-United States Great Lakes Water Quality Agreement of 1978, and while continuing the terms of the earlier COA agreements, places greater emphasis on the control of toxic substances and pollution from diffuse urban and agricultural sources. The Agreement reflects a greater awareness of all Federal and Provincial programs pertinent to the health of the Great Lakes ecosystem, and the development of programs undertaken directly through COA increase the focus in the Great Lakes.

1.2 Purpose

The purpose of the 1982 Canada-Ontario Agreement is to renew and strengthen cooperation between Canada and Ontario in meeting the obligations assumed by Canada under the 1978 Canada-U.S. Agreement. It is also to provide for cost sharing of specific programs which the Province will undertake to assist Canada in meeting these obligations.

1.3 Obligations

The obligations assumed by the governments under the Agreement require the development and implementation of programs and measures within their respective areas of legislative responsibility to maintain or improve water quality of the boundary waters. In order to achieve this purpose, maximum efforts will be made to develop a better understanding of the Great Lakes Basin Ecosystem and to protect it by the elimination or reduction, to the maximum extent practicable, of pollutants discharged to the system.

2.0 THE 1982 CANADA-ONTARIO AGREEMENT RESPECTING GREAT LAKES WATER QUALITY

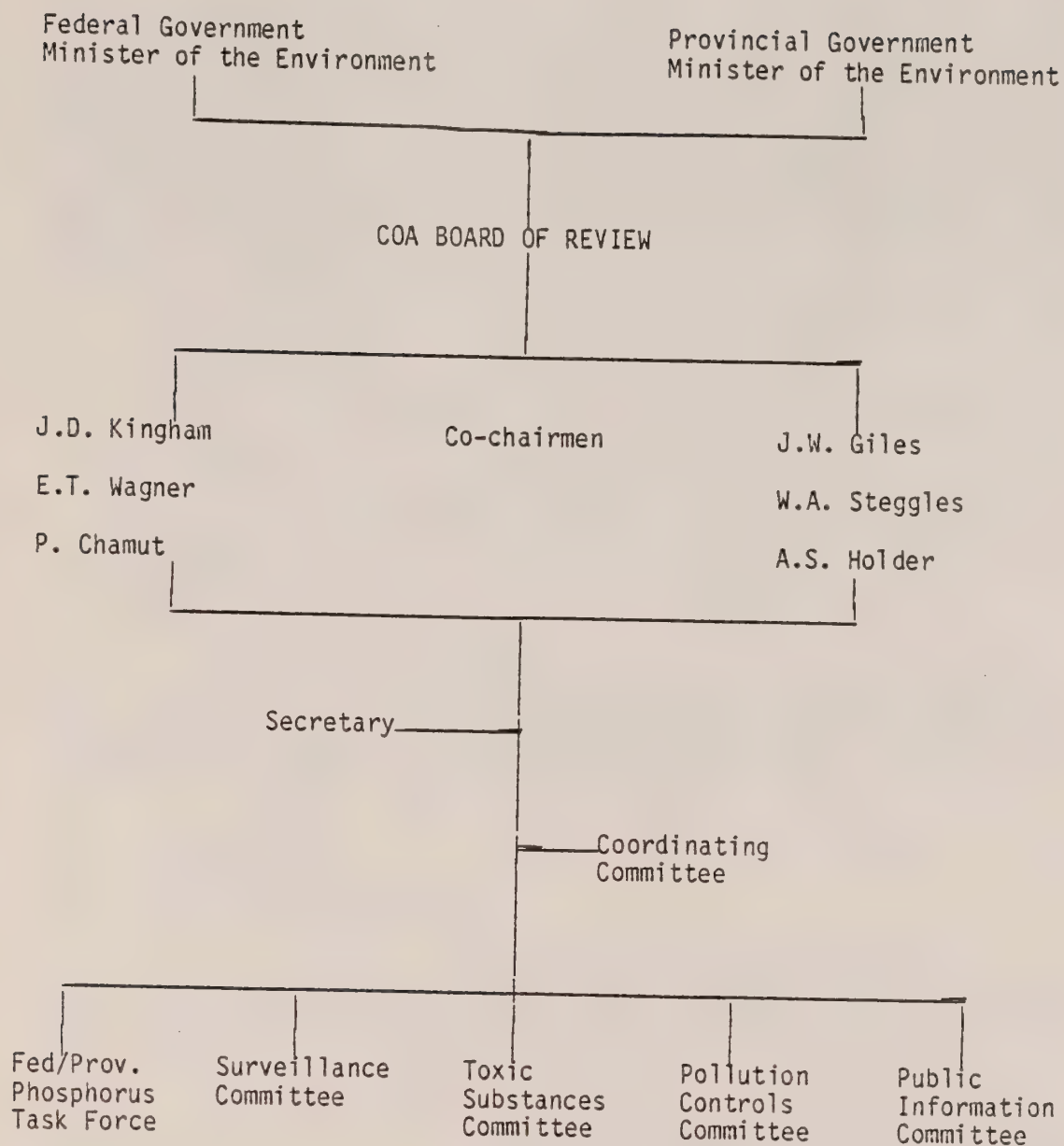
2.1 Policy and Program Management

The former Canada-Ontario Agreement (1976) was founded on the 1972 Canada-U.S. Great Lakes Water Quality Agreement. The international agreement and thus the 1976 COA were intended to address the various physical, chemical and biological pollution problems recognized as prime concerns of the day. Specific parameters were monitored and programs developed to reduce pollutants to an acceptable level. COA was concerned with the funding of surveillance carried out by the Province to meet Canadian obligations under the international agreement, and the development and funding of research primarily for the investigation of urban drainage.

The recognition and acceptance of the ecological approach to water quality problems in the 1978 international agreement and the 1982 COA demands multidisciplinary consideration of issues and their interactive elements within an integrated management concept. It is essential that COA Board of Review and Committee members be cognisant of all activities pertinent to Great Lakes problems to enable them to assess the adequacy of programs, and to develop and recommend new policies and programs to resolve existing and emerging problems. Even though the COA Board of Review may not be actively engaged in and responsible for all water and related programs in the Great Lakes basin, it must be able to approach issues from a "total management" perspective. Of particular concern are those programs undertaken by governments to meet requests from the International Joint Commission, to ensure compatibility with governmental initiatives, and to ratify all information forwarded to the IJC to fulfill these requests. Federal-Provincial cooperation is now effected not only through the cost sharing of specific programs but also through work sharing, information transfer and the coordination of pertinent departmental programs.

The COA Board of Review serves as a focus for Canadian Great Lakes policy review, not only as it pertains to Federal and Provincial perspectives, but also as it relates to those of the U.S. Federal and State Governments and the International Joint Commission. The Board is in a position to influence the extent and direction of progress at the governmental level in Canada, and to a minor extent in the United States. Of note in this regard are two binational committees established to deal with Niagara River policy and technical issues. The committee on policy consists of representatives from the pollution control agencies of the Federal, State and Provincial governments. The technical Niagara River Toxics Committee is comprised of governmental scientists and managers and reports on problems and recommends strategies for pollution control in the Niagara River and contiguous areas.

2.2 COA Organization



3.0 COA BOARD AND COMMITTEE MEMBERSHIP AND FUNCTIONS

3.1 Board of Review

The Board of Review consists of six members, three each from the Federal and the Provincial governments. The Federal membership consists of two senior staff representatives from the Department of the Environment - Ontario Region, and one from the Department of Fisheries and Oceans - Ontario Region. The provincial membership consists of two senior staff representatives from the Ontario Ministry of the Environment, and one from the Ministry of Natural Resources. The members as of March 31, 1984 were:

Government of Canada

J.D. Kingham
Department of Environment

E.T. Wagner
Department of Environment

P. Chamut
Department of Fisheries
and Oceans

Government of Ontario

J.W. Giles
Ministry of Environment

W.A. Steggles
Ministry of Environment

A.S. Holder
Ministry of Natural
Resources

The Board is charged with maintaining a current knowledge of national and provincial policies and programs pertinent to Great Lakes Water Quality, formulating recommendations to the Parties to the Agreement with respect to the implementation of COA, monitoring the activities undertaken, and reporting annually.

3.2 COA Committees

3.2.1 Coordinating Committee

The Coordinating Committee consists of ten members, viz., Federal and Provincial co-chairmen plus two members from each of the other COA committees (the co-chairman of the four other committees). The co-chairman of the Coordinating Committee are also members of the Water Quality Programs Committee of the IJC Great Lakes Water Quality Board. Thus, the Coordinating Committee is fully informed of the initiatives proposed by the IJC Water Quality Board which influence the federal and provincial programs and policies developed to preserve and enhance Great Lakes water quality.

The Coordinating Committee reports to the Board of Review on these initiatives and under its direction advises other COA committees in fulfilling COA requirements. It also reports jointly with the other committees on significant findings and problems which may affect Canada and Ontario in meeting their commitment to the Canada-U.S. Great Lakes Water Quality Agreement.

3.2.2 Surveillance Committee

The Surveillance Committee is co-chaired by the Federal and Provincial members responsible for Great Lakes surveillance - the Manager of the Surveillance Program, Inland Waters Directorate, Environment Canada, and the Manager of the Great Lakes Section, Water Resources Branch, Environment Ontario. Other members of the Committee represent Department and Ministry Branches and Sections directly involved in Great Lakes water quality and monitoring. That part of the program undertaken by provincial agencies is carried out primarily in the nearshore waters of the Great Lakes and their connecting channels. The work of Federal agencies is devoted to open water surveillance and fisheries research. The object is to assess the state of, and trends in, overall health of the lakes through the measurement of physical, chemical and biological parameters and the assessment of numerous hazardous polluting and toxic substances.

The Committee is required to review annually the objectives, scope, expected output and associated costs of surveillance programs proposed by Federal and Provincial agencies, and make recommendations for approval and funding under the Agreement. Emphasis is given to greater coordination of cost-effective programs, and reports on the progress being achieved, including new problems and findings of the surveillance program.

3.2.3 Toxic Substances Committee

The Toxic Substances Committee is co-chaired by the Scientific Advisor to the Director General, Environment Canada, Ontario Region and the Manager of the Aquatic Contaminants Section of the Ministry of the Environment. Members of the Committee are drawn from all agencies having to do with toxic substances to ensure a wide cross-section of expertise. This includes all aspects of the detection, quantification, effect, and control of toxic and hazardous polluting substances.

The Committee reports to the Board of Review on those Federal and Provincial programs and activities relevant to hazardous polluting substances and persistent toxic substances. It identifies priority areas, issues of concern, evaluates the programs of both Parties, and makes an annual report thereon.

To date emphasis has been placed on providing for an effective exchange of information among the scientists and managers involved.

3.2.4 Pollution Controls Committee

The Pollution Controls Committee is comprised of the Manager, Pollution Control Division of the Federal Environmental Protection Service, Ontario Region, and the Assistant Director of the Provincial Water Resources Branch. The Committee is charged with monitoring all activities, except for surveillance and toxic substances, undertaken to fulfill the requirements under "Programs and Other Measures", Article VI of the 1978 Canada-U.S. Great Lakes Water Quality Agreement. Under the direction of the Board of Review, it is empowered to establish work groups/task forces to consider specific issues and prepare reports.

In general, the Committee monitors activities, including research, relevant to: pollution from municipal and industrial sources, including pollution abatement and compliance; eutrophication; pollution from agriculture, forestry and other land use activities; pollution from shipping, dredging, and other land use activities; and contingency planning. Reports on significant findings and problems are required as they occur. An annual review is also required by the Board of Review to chart the progress of various control and restoration programs.

3.2.5 Public Information Committee

This Committee is composed of representatives from the Ontario Ministry of the Environment, Environment Canada-Ontario Region, and the Department of Fisheries and Oceans-Ontario Region. The prime goal of the Public Information Committee is to provide information to the public on the purpose and achievements of COA, and to explain, in common terms, this unique Agreement which provides for Federal-Provincial cooperation to improve Great Lakes water quality. It is also incumbent upon the Committee to keep the Board of Review informed on the wide spectrum of information released on Great Lakes environmental issues.

The Committee arranges publicity for COA activities and develops resource materials to promote better public understanding of Great Lakes Issues, and COA involvement in these issues.

3.2.6 Federal/Provincial Phosphorus Task Force

In January 1984, the Federal/Provincial Phosphorus Task Force was established as an adjunct to the COA Coordinating Committee for the sole purpose of developing a Canadian Phosphorus Management Plan in compliance to the "Phosphorus Load Reduction Supplement to Annex 3. The Task Force was co-chaired by DOE and MOE and consisted of 6 additional members each from Canada and the province.

In developing a Canadian Phosphorus Management Plan, the Task Force was given the following responsibilities:

- to develop a phosphorus management plan for presentation to the COA Board of Review;
- the development of a Canadian position vis-a-vis Lake Ontario phosphorus load allocation; and
- the identification, within the phosphorus management plan of an implementation plan including:
 - i) the designation of the work to be undertaken by the Federal government;
 - ii) the designation of the work to be undertaken by the Provincial government; and
 - iii) the identification of resource requirements to undertake the plan, including work and cost shared arrangements necessary between the Federal and Provincial governments.

4.0 1984/85 FISCAL YEAR ACTIVITIES

4.1 Board of Review

The Board of Review held seven meetings during the fiscal year. In addition to the ongoing administration of Board and Committee affairs, the Board considered new and developing issues in the Great Lakes Basin ecosystem.

Committee annual progress reports for FY 1983/84 were reviewed and approved, and programs developed for FY 1984/85 were discussed and ratified. The agricultural agencies of both governments participated in the development of the Canadian Phosphorus Management Plan in compliance with Annex 3. Information collected and prepared by the Committees for submission to the IJC was reviewed and vetted by the Review Board.

The Board of Review continued to keep abreast of Niagara River concerns primarily through the work of the Niagara River Toxics Committee. A watching brief is also being maintained on the U.S. Environmental Protection Agency initiative in cooperation with Michigan, Ontario and DOE in the connecting channels of the upper Great Lakes.

4.2 Coordinating Committee

The Coordinating Committee in cooperation with the Public Information Committee, Surveillance Committee, Toxic Substances Committee and Pollution Controls Committees, early in the year, undertook the development of work priorities for FY 1984/85. The reviews of current programs and priorities were to be made with the object of improving the flow of information under the Canada-Ontario Agreement to the Water Quality Board of the International Joint Commission. Priority attention was given to toxics-related assessment and control programs, the dredging program recommendations of the IJC Water Quality Board, as well as pollution from shipping, the contingency planning and surveillance programs.

4.3 Federal-Provincial Phosphorus Task Force

In October 1983, Canada and the United States formally agreed to the "Phosphorus Load Reduction Supplement" to Annex 3 of the 1978 Canada-United States Great Lakes Water Quality Agreement. The agreement calls for certain specific measures to protect the upper Great Lakes and a broad range of measures to further reduce phosphorus loading to the lower Great Lakes.

The requirements of the "Phosphorus Supplement" will be coordinated in Canada under the Canada-Ontario Agreement Respecting Great Lakes Water quality. To this end, a Federal/Provincial Phosphorus Task Force was created by the Board of Review under the Agreement with representation from the Federal Departments of Agriculture, Environment and Fisheries and Oceans, and the Provincial Ministries of Agriculture and Food, Environment, and Natural Resources to develop a phosphorus management and implementation plan. A brief description of the proposed Canadian phosphorus load reduction plan prepared during FY 1984/85 follows.

In the Upper Great Lakes further phosphorus controls are required at municipal wastewater treatment facilities discharging more than 1 mgd. This will require capital expenditures (for phosphorus removal) at four locations (Sault Ste. Marie, Sudbury, Kincardine and Port Elgin).

In accordance with the Great Lakes Supplemental Agreement 1983, United States and Canada are committed to the development and implementation of a plan to further reduce the annual phosphorus loading to Lake Erie by 2,000 tonnes, of which Canada's allocation is 300 tonnes. The proposed Canadian plan for Lake Erie addresses a 100 tonne phosphorus reduction from municipal and industrial sources and for a 200 tonne reduction from agricultural cropland sources of phosphorus. A major emphasis is now to be placed on agricultural sources since major reductions have already been made from municipal and industrial sources.

Notwithstanding the emphasis on agricultural sources, municipal sources of phosphorus would be further reduced by 30 tonnes/year (approximately 10% reduction) by reducing the effluent concentration from 1.0 mg/L to 0.9 mg/L. Industrial sources of phosphorus would be reduced by 95 tonnes/year (approximately 33% reduction) when discharges of three companies are brought into compliance with existing requirements.

Cropland sources of phosphorus to Lake Erie would be reduced by 200 tonnes (approximately 10% reduction) through adoption of improved soil management and conservation practices on those farms located in priority drainage areas. A 0.5 kg/ha reduction of total phosphorus over 400,000 hectares (approximately 30% of improved cropland) of cropland would achieve the program objective. Agriculture Canada and the Ontario Ministry of Agriculture and Food will implement a set of coordinated, parallel activities under the proposed Southwestern Ontario Soil and Water Quality Enhancement Agreement.

The plan for Lake Ontario is based upon a revised annual overall phosphorus target reduction of 430 tonnes per year to be achieved by both countries. The final allocation of 430 tonnes between the two countries has not yet been decided. In Canada, it is proposed that the reduction be made by continuation of existing municipal and industrial phosphorus control programs and the expected adoption of similar agricultural cropland measures as are proposed for the Lake Erie drainage basin.

Environment Canada and the Ontario Ministry of Environment and Natural Resources would implement an environmental monitoring and modelling program to evaluate the effectiveness of the phosphorus control measures on non-point sources of pollution and to provide a basis for program review. It is proposed that the components of the environmental monitoring and modelling program be used to show that the Canadian phosphorus management plan has achieved the target load reductions required in Annex 3 of the 1978 Great Lakes Water Quality Agreement.

4.4 Surveillance Committee

The Surveillance Committee reported to the Board of Review on those programs and activities undertaken by Ontario and Canada pursuant to the requirements of Schedules A and D of the 1982 Canada-Ontario Agreement respecting Great Lakes Water Quality. The work undertaken by the Federal and Provincial programs are reflected in Tables 1 and 2 respectively.

4.4.1 Federal Program

Canada's prime responsibility under the Canada-U.S. Great Lakes Water Agreement is the conduct of open lake surveillance complementing that undertaken by U.S. agencies. The federal Department of the Environment is responsible for the monitoring of conventional parameters and contaminants in the waters of the open lakes. The Department of Fisheries and Oceans, in concert with the Ontario Ministry of Natural Resources, contributes to the International Open Lakes Fish Contaminants Program which is coordinated with similar programs conducted by the U.S. EPA and Fish and Wildlife Service. Table 1 presents the surveillance and related research programs carried out by the federal government in 1985.

Information based on these activities is published in federal government reports and in scientific papers. Pertinent results from these studies are also summarized and submitted to the IJC Water Quality Board for inclusion in its Annual Report to the International Joint Commission.

TABLE 1: FEDERAL SURVEILLANCE AND RELATED RESEARCH PROJECTS
1984/85

A. INLAND WATERS DIRECTORATE - ONTARIO REGION

1. Lake Superior Intensive Surveillance
2. Offshore Surveillance and Analysis - Lake Ontario
3. Niagara River Water Quality Monitoring
4. St. Lawrence River Water Quality Monitoring
5. Testing and Performance of the APLE Systems
6. Organics in Atmospheric Precipitation
7. Precipitation Chemistry Network
8. ID of New Contaminants in the Niagara River using Spottail Shiners
9. Offshore Surveillance and Analysis: Organics in Lake Ontario
10. Lake Huron Surveillance

B. CANADIAN WILDLIFE SERVICE

1. Levels of OC Contaminants in Herring Gull Eggs
2. Contaminant Bioeffects Monitoring in Herring Gulls and Other Fish Eating Birds
3. Heavy Metals in Herring Gulls
4. Survey of OC Levels in Mink from Lake Ontario and Snapping Turtles from Lake Erie/Algonquin Park

C. GREAT LAKES FISHERIES RESEARCH BRANCH - DFO

1. Fish Health Assessment - Hamilton Harbour
2. Lake Trout Reproduction
3. Great Lakes Contaminants Surveillance
4. Phycological Studies in the St. Lawrence Great Lakes
5. A Rapid Microcomputer - based Toxicity Test for the Bioassessment of Sediment-associated Contaminants
6. Phosphorus Bioavailability to Algae in the Lower Great Lakes Basin
7. Biological Tissue Archive
8. Long Term Biological Index Monitoring - Lake Ontario

D. NATIONAL WATER RESEARCH INSTITUTE

1. Lake Erie Water Quality Trend Analysis
2. Sediment Bank - Great Lakes
3. Environmental Simulation - Statistical Analysis
4. Presentation and Interpretation of Great Lakes Physical Data - User Services
5. CCIW Data Archiving
6. Water Quality Data Base Administration
7. EDP Support - Data Management
8. Graphics and Microcomputer Networking
9. Microbial Response to Loadings in lake St. Louis and Lake Erie
10. IJC Quality Control
11. Quality Assurance Program - Dredging
12. Computer Services for Water Management Research
13. Logistic Support to NWRI, Field Equipment and Vehicles
14. Open Lakes Surveillance Support
15. Common-uses Equipment Maintenance and Acquisitions
16. Support to External Agencies
17. Limnological/Meteorological Instrumentation Support

Status of the Lakes

Highlights of the current status of each of the Great Lakes with respect to eutrophication and contaminants is reported based on selected projects and observations from the 1984/85 federal programs. While some data have not been collected over a sufficient number of years to establish long-term trends, there is nevertheless adequate information to permit statements on changes. Presented herein are the most recent data and information available on the status of the Great Lakes. Available data include contaminants in water, herring gulls, and fish; incidence of tumors in fish; conservative ions in the open lake and nutrients and other eutrophication-related parameters from the open lake.

Lake Superior

1983 was declared as the intensive study year for Lake Superior, coordinated through the Surveillance Work Group under the International Joint Commission. Four lake-wide water quality surveys were completed under the federal surveillance program. Samples were collected at approximately 112 stations for routine chemical analysis (nutrients, major ions, chlorophyll, etc.), and at about 20 selected stations for organic contaminant analysis. Metal analyses were done by U.S. EPA under contract.

Preliminary results from the 1983 open-lake sampling program indicate Lake Superior is oligotrophic, with deteriorated water quality generally restricted to specific areas along the shoreline. While total phosphorus concentrations appear to be lower, the concentrations of the major ions, such as sodium, calcium, magnesium, along with sulfate and nitrate have increased since the last major survey conducted in 1973. Metal concentrations remain low relative to all other Great Lakes, and selenium concentrations, which are the cause for some concern in Lakes Huron, Michigan, and Erie remain quite low.

Organochlorine pesticides and PCB were measured at 16 offshore stations in Lake Superior in June 1983 (13). Benzenehexachloride (BHC), lindane, pp-DDE, dieldrin, and PCB were widespread in the waters of Lake Superior. Concentrations of BHC ranged from 3-16 ng/L while total PCB levels were measured from 1-5 ng/L. The concentrations of other organochlorine pesticides were below 1 ng/L.

Mean contaminant burdens in lake trout and rainbow smelt samples collected from two sites on Lake Superior are slightly lower than levels found in the same species from the other Canadian Great Lakes. Additional years of collection and data analysis will be required before trends can be detected.

Levels of organochlorine compounds in herring gull eggs continue to be monitored from two colonies on Lake Superior. In both the Mamainse Harbor/Agawa Rocks and Granite Island colonies, there appears to have been a general decrease in levels of DDE, DDT, HCB, mirex, and total PCB over the last 9 to 10 years. During that time period, concentrations of dieldrin have remained fairly constant in both colonies.

Emerging Issues

Toxaphene residues have been identified in whole fish samples of large lake trout collected from two sites on Lake Superior from 1978 to 1983. Concentrations ranged from 0.37 to 10.0 mg/kg (\bar{x} = 2.76 mg/kg) in whole fish samples, while levels in edible portion samples averaged approximately 75% of the whole fish body burdens. Monitoring to establish trends of toxaphene in Lake Superior lake trout will continue.

Lake Huron

There has been no observed degradation from the oligo-mesotrophic status of Lake Huron since the 1970's. The net change in spring surface total phosphorus concentration of open lake stations from 1971 to 1983 is not significantly different from zero.

The concentration of nitrates and nitrites in the open lake surface waters of Lake Huron was 0.305 ± 0.017 mg/L during the spring of 1983. This is a significant increase from the 0.290 ± 0.012 mg/L average based on a similar set of stations sampled in 1980. The resultant average annual rate of increase from 1980 to 1983 of 5 ug/L/year is very close to the average annual rate reported using a larger subset of open lake stations.

The statistically significant increase in Lake Huron open lake surface silica values between 1971-1980 continued between 1980-1983. Spring surface concentrations averaged 1.637 ± 0.051 mg/L in 1983 compared with 1.529 ± 0.074 mg/L in 1980. The significance of their increases is under study and has not yet been determined.

In 1983, mean PCB levels in whole fish samples of lake trout continued to exceed the Agreement objective (0.1 mg/kg). In relation to other Great Lakes, levels of selenium and arsenic continue to be greater in top predator and rainbow smelt samples from Lake Huron, particularly at sites in Georgian Bay and the northern portion of the main lake where natural resources of these trace metals are suspected.

During 1983, mean total PCB levels in whole fish samples of rainbow smelt continued to exceed the Agreement objective. Between 1979 and 1983, concentrations of total PCB in rainbow smelt exhibited high year to year variability and no obvious trend.

In 1983, mean annual concentrations of DDE, DDT, dieldrin, HCB, mirex, and total PCB in herring gull eggs from both Double Island and Chantry Island were lower than they had been during any year since the monitoring program began in 1974. It should be noted that much of the decrease of contaminants in herring gull eggs occurred between 1974 and 1978, with concentrations over the past 5 to 6 years remaining fairly stable.

Emerging Issues

Based on a survey of white suckers collected during spring spawning runs (1981-1983) in Canadian nearshore waters of Lake Huron, lip papillomas were not observed in any white suckers collected in the northern portion of the lake. In contrast, lip papillomas were reported from white suckers, (over 40 cm long) collected in eastern central and southeastern Lake Huron, with the highest incidence (40%) at a site in southeastern Lake Huron. Although there is yet no conclusive evidence confirming the role of ambient chemical carcinogens, there is increasing evidence that Great Lakes fish are responding to chemical exposure and that a systematic fish health surveillance program would provide early warning mechanism to identify sites and species impacted by chemical stress.

Lake Erie

In general open lake surveillance of Lake Erie is the responsibility of U.S. agencies with the exception of contaminants work on fish and herring gulls being the responsibility of the Dept. of Fisheries and Oceans and Environment Canada respectively and some additional research work conducted by the National Water Research Institute. The Ontario Ministry of the Environment is responsible for Canadian nearshore work. the following presents highlights of the results of some of the federal work.

Over the last 15 years, annual mean total phosphorus concentrations in the central basin have declined by 56%. While not as dramatic as the loading reductions, this represents a positive indication that the lake is responding to remedial programs.

In recent years (1980-1984), oxygen depletion rates appear to have decreased and are less variable. While the central basin still undergoes some degree of anoxia, this apparent decrease in the rate of oxygen depletion and less variability suggest that the phosphorus reduction program is having a positive effect on this region.

Fish contaminant data for walleye collected primarily from the western basin of Lake Erie exceeded Agreement objectives for total PCBs in whole fish samples. In general, concentrations of total PCB and other organochlorine contaminants in walleye exhibited year-to-year variability and no obvious trend. Levels of mercury have decreased since 1977 and do not exceed the Agreement objective. Concentrations of other contaminants analyzed remain relatively low.

During 1983, mean PCB levels in whole fish samples of rainbow smelt continued to exceed the Agreement objective. Concentrations of PCB and DDT in rainbow smelt exhibited year-to-year variability and no obvious trend. Concentrations of other contaminants remain relatively low.

In 1983, mean annual concentrations of DDE, DDT, dieldrin, HCB, mirex, and total PCB in herring gull eggs from two Lake Erie colonies were lower than they had been during any year since the monitoring program began in 1974 (with the exception of mirex in eggs from both colonies which was within 0.04 mg/kg of the lowest). Much of the decrease in organochlorine contaminants occurred between 1974 and 1978, with concentrations remaining fairly stable over the past 5 to 6 years.

Emerging Issues

The presence of dioxins in Great Lakes biota was first reported by the Water Quality Board in its 1978 report. The Board's 1983 report identified low levels of 2,3,7,8-TCDD in herring gull eggs from a colony in the western basin of Lake Erie. Recently, results of fish sampled in the western basin have identified low levels of 2,3,7,8-TCDD in a limited number of large carp. Monitoring efforts are being expanded to examine top predator species such as coho salmon and walleye. Recent Ontario data on edible tissue samples of yellow perch walleye, and white bass collected from the western basin showed no detectable 2,3,7,8-TCDD.

Lake Ontario

Data (on the yearly trend in lakewide spring total phosphorus concentrations) demonstrate the decrease in spring total phosphorus concentration over time; 1983 had the lowest mean value recorded to date.

(i.e., a rate of decrease of 1.0 ug/L.a). At this rate, by 1986 total phosphorus levels in the open waters of Lake Ontario could meet the 10.0 ug/L objective originally proposed by the Great Lakes Science Advisory Board. Daily monitoring in the Niagara River at its point of entry into Lake Ontario has shown a similar decrease in total phosphorus concentrations during the 1976-1983 period. During this period, the loadings of total phosphorus from the Niagara River to Lake Ontario have decreased by 24%. Because the Niagara River contributes approximately 40% of the total phosphorus load to Lake Ontario, it is likely that the observed decrease in total phosphorus concentration in the lake is primarily attributable to the decrease in loading from the Niagara River.

Spring surface nitrates and nitrite data for 1979-1983 demonstrate a general increase in concentration. Linear regression analysis of these data indicated the rate of increase to be 8.3 ug/L a (or 14,000 t/a). This increasing trend was substantiated by data collected at the Niagara outlet to Lake Ontario where a similar rate of increase in nitrates (NO_3) and nitrites (NO_2) (10.0 ug/L.a) was observed during the 1976-1983 period. Since 1975, nitrate loadings from the Niagara River to Lake Ontario have increased approximately 63%. Recently, Environment Canada compared the rate of nitrogen increase in Lake Ontario and Huron. Lake Ontario's volume is approximately one-half that of Lake Huron and the rate of change in $\text{NO}_3 + \text{NO}_2$ concentration in Lake Ontario is almost twice that of Lake Huron. This suggests that both lakes may be responding in a similar manner to a common loading source.

During 1983, large-volume whole water samples were collected in early October at 14 stations on Lake Ontario to establish lakewide baseline levels of trace organic contaminants. Sixteen of the 23 compounds analyzed were ubiquitous in distribution. Only toxaphene, mirex, photomirex, and the lower order chlorobenzenes were not detected.

No pesticides exceeded the 1978 Agreement objectives during 1983. However, it is important to note that, for those compounds which have specific objectives, most (lindane, heptachlor epoxide, dieldrin, endrin, and DDT) had ambient concentrations within one order of magnitude of the objective. To help put this into perspective, an average lakewide concentration of 1 ng/L is roughly equivalent to a total contaminant burden of 1,640 kg.

A one-way analysis of variance was used to compare mean contaminant levels between years in whole fish samples of a single age class (+4 years) of Lake Ontario lake trout collected between 1977 and 1983. PCB concentrations declined steadily from 1977 to a significantly lower level in 1981. Mean PCB concentrations significantly increased from 1981 through 1983. Additional years of collection will be needed to corroborate this trend. Dieldrin, mirex,

pp'DDE, and DDT have all show significant declines from 1977; however, much of the decrease occurred between 1977 and 1978. During 1983, mean concentrations of DDT, total PCB, and mirex in lake trout continued to exceed Agreement objectives for whole fish samples. Trace metal levels were nominally consistent from year-to-year with mercury showing a significant decline over the period 1977 to 1982.

In general, contaminant levels measured in rainbow smelt exhibited year-to-year variability and no obvious trend. During 1983, mean total PCB levels in whole fish samples of rainbow smelt continued to exceed the Agreement objective. In 1983, mean annual concentrations of DDE, DDT, dieldrin, HCB, mirex, and total PCB in herring gull eggs from the two Lake Ontario colonies were lower than they had been during any year since the herring gull monitoring program begin in 1974 (with the exception of dieldrin in Snake Island eggs which was within 0.02 mg/kg of the lowest). Much of the decrease in organochlorine contaminants occurred between 1974 and 1978, with concentrations over the past 5 to 6 years remaining fairly stable.

Emerging Issues

Preliminary surveys of fish and sediment samples have identified polychlorinated diphenyl ethers (PCDPE) as a trace contaminant throughout Lake Ontario and in Whitby Harbour in particular. PCDPE's occur as impurities in many chlorophenol preparations, and diphenyl ethers are a major (73.5%) component of the heat transfer medium Dowtherm A. PCDPE's are acutely toxic to fish at low concentrations, bioaccumulate, and induce enzyme systems in mammals. A monitoring study on 20 fish samples from Lake Ontario and the St. Lawrence River revealed that 17 of the samples contained detectable levels of PCDPE's from 0.2 to 8.2 mg/kg. Further studies will determine the extent of PCDPE contamination throughout the Great Lakes.

An association has been demonstrated between environmental pollution and tumors in fishes in Lake Ontario. Tumors (i.e., oral papillomas) increased dramatically in frequency near the Oakville-Burlington area of Lake Ontario and then decreased along a gradient as one moved away from the Oakville-Burlington. In addition tumor sizes increased in the Oakville-Burlington area and were seen to shift automatically from a more or less random body distribution to an exclusive location on the lips. These results have subsequently been reproduced in independent monitoring studies.

4.4.2 Ontario Program

The surveillance program of the Province of Ontario conducted by the Ontario Ministry of the Environment under COA addresses water quality problems in the nearshore areas of the Great Lakes and their connecting waterways, including discharges, urban and agricultural drainages and shore-based construction activities. The Province's surveillance and related research projects are listed in Table 2.

TABLE 2 PROVINCIAL SURVEILLANCE AND RELATED RESEARCH PROJECTS
1984/85

LAKE SUPERIOR

- Lake Superior Embayments
- Thunder Bay Environmental Survey
- Thunder Bay - Physical Characteristics
- Peninsula Harbour Environmental Survey
- Nipigon Bay Environmental Survey
- Lake Superior - Trace Contaminant Biomonitoring Program
- Lake Superior Embayment Benthos and Sediments
- Nearshore Filamentous Algal Growth and Contaminants Survey - Lake Superior

ST. MARYS RIVER

- St. Mary's River Environmental Monitoring

LAKE HURON

- Penetang-Midland-Sturgeon Bay Study

ST. CLAIR RIVER/DETROIT RIVER SYSTEM

- Contaminant Loadings to the St. Clair River, Lake St. Clair and Detroit River
- St. Clair/Detroit River Trace Organics
- St. Clair and Detroit River Biomonitoring
- Detroit River

LAKE ERIE

- Mass Exchange between Rondeau Bay and Lake Erie
- Nanticoke
- Nanticoke Environmental Study - Phytoplankton Programme

NIAGARA RIVER

- Upper and Lower Niagara River Water Quality
- Nearshore Cladophora Contaminant Monitoring - Lake Ontario and Niagara River

LAKE ONTARIO

- Hamilton Harbour
 - a) Effects of Hamilton Harbour on nearshore Lake Ontario
 - b) Effects of reductions in ammonia, BOD and phosphorus inputs on water quality
- Oakville - Ford Plant
- Outfall Assessments, Lake Ontario
- Humber River Plume in Lake Ontario
- Toronto Waterfront
 - a) Inputs
 - b) Bacteriological Quality at Beaches
 - c) Effects of Dredging/Lakefilling Activities
 - d) Circulation
 - e) Bacteriological Status of Eastern Beaches
- Impacts of Lakefill Embayments on Nearshore Sediment Quality
- Bay of Quinte Study ("Project Quinte")
- Belleville: Bacteriological Status Following STP Expansion

Table 2 (continued)

ST. LAWRENCE RIVER

- St. Lawrence River - Maitland
- St. Lawrence River - Iroquois, Morrisburg and Cardinal
- St. Lawrence River - Cornwall/Massena Area

BASIN WIDE STUDIES

- Environmental Impacts on In-place Pollutants in Sediments
- Seasonal Variation in Contaminant Body Burdens of Macroinvertebrates
- Nearshore Young-of-the-Year Fish Contaminants Surveillance
- Stratified Tributary Monitoring
- Water Works Intake Monitoring Program
- Interlake Mass Balance
- Radioactivity Monitoring
- Development of Instrumentation
- Development of Sampling Technology and Quality Control and Assurance Methodologies

SUPPORT ACTIVITIES

- Data Management
- Data Analysis
- IJC and COA Support
- Requests for Information

Information based on these activities is published in reports by the Ministry of Environment and in scientific papers. Pertinent results from these studies are also summarized and submitted to the IJC Water Quality Board for inclusion in its Annual Report to the International Joint Commission.

Selected Projects and Observations

Lake Superior

Areas of Concern in the nearshore regions of Lake Superior are confined to embayments at Thunder Bay, Nipigon Bay, Jackfish Bay and Peninsula Harbour.

Based on the 1983 international intensive year study for Lake Superior, assessments were continued by the province of the impact of pulp and paper mill discharges, contaminant levels and recommendations for remedial actions, at three Lake Superior embayments - Thunder Bay, Nipigon Bay and Jackfish Bay. Surveillance work by the province concentrated on determining the degree and extent of impairment of the aquatic environment in the area of Peninsula Harbour as a result of wastewater discharges from James River Marathon pulp mill and the Marathon sewage treatment plant (STP).

Preliminary results confirm those of earlier surveys in demonstrating continued residual mercury/PCB contamination of sediments and biota and ongoing water quality impairment (especially phenols, fecal coliform bacteria and metals) in these embayments. Other potentially hazardous (toxic) compounds were also detected in water near pulp and paper mill outfalls (resin, aromatic and fatty acids).

The province commenced assessment of 1983 field studies on nearshore water quality after spring melt and contaminants in sediments and benthic organisms.

St. Mary's River and Lake Huron

Areas of Concern studied by the province in 1984 included the St. Mary's River and the embayments in the Penetang-Midland-Sturgeon Bay area (Severn Sound).

In the St. Mary's River, assessment of the effectiveness of remedial measures by Algoma Steel and of river flow changes (following the completion of the Great Lakes Power hydroelectric project) on water quality were continued by the province. Biomonitoring sampling using freshwater clams to detect levels of phenolic compounds, PCBs, organochlorine pesticides and PAHs along the Ontario shoreline of the river highlighted sources of significant PAH compounds. This activity was complemented with limited effluent sampling from Algoma Steel's Terminal Basins for trace organics.

The province continued to sample at its long term monitoring stations in the Penetang-Midland-Sturgeon Bay area to assess water quality changes as a result of reduced phosphorus loadings and the new Victoria Harbour STP (August 1983).

St. Clair River, Detroit River and Lake Erie

The St. Clair River and Detroit River have both been identified to the IJC as Areas of Concern:

Provincial monitoring commenced for contaminants in water and suspended sediments at the mouths of tributaries to the St. Clair and Detroit Rivers. PCBs, pesticides and chlorinated aromatics were also monitored in water samples at the St. Clair River headwaters, the river delta, Detroit River headwaters, Trenton Channel and Amherstburg Channel to estimate the loading of trace organics to and from the system. Biological monitoring of these contaminants using freshwater clams was also continued by the province to assess the significance of point source discharges.

The province completed a three-year sampling project for bacterial parameters along the Ontario shoreline of the Detroit River. The City of Windsor, in conjunction with the Provincial Ministry of the Environment, was also carrying out a comprehensive feasibility study to outline a cost-effective pollution control strategy for reduction of municipal contaminant loadings.

Current recording instruments were operated by the province to the channel connecting Rondeau Bay and Lake Erie to estimate the mass change. There is a high loading of suspended solids being discharged to the bay as a result of agricultural runoff and the estimates of mass exchange will provide insight into assessing mass balance and the formulation of abatement programs.

An integrated report was published, covering studies completed in the period 1968-78 on the Nanticoke (Lake Erie) industrialized area. The integrated report for the period 1979-1983 was in preparation by the Nanticoke Environmental Committee (MOE, MNR, Ontario Hydro, Stelco, Texaco).

Niagara River, Lake Ontario and St. Lawrence River

Identified Areas of Concern in the Lake Ontario are the Niagara River, Hamilton Harbour, Toronto Waterfront, Port Hope, Bay of Quinte and the St. Lawrence River at Cornwall.

Provincial activities in the Niagara River included preliminary analysis of 1983 surveys (water, sediment, biota, clams) to assess the impact of U.S. and Canadian industrial and municipal discharges and non-point source drainage on river water quality and biota and to detect trends in trace contaminants, nutrient and bacteria

levels. Contaminant level monitoring using Cladophora was continued by the province to determine suspected contaminant source loadings. Ministry staff also participated on the international Niagara River Toxics Committee and the publication and release of its major report. The province acted as intervenor in the litigation between the Industrial Liaison Committee (ILC) and the New York Department of Environmental Conservation (NYDEC), undertaking modelling studies to illustrate that the Niagara Falls Sewage Treatment Plant discharge permit levels were not stringent enough to prevent adverse impacts on the lower river.

Preparation of a technical summary and management report and three technical reports was commenced based on detailed investigations conducted by the Ministry on Hamilton Harbour from 1975 to 1983. Management options to be assessed include those allowing further water quality deterioration, maintenance of existing quality, and improvement in water quality. A management strategy is to be developed starting in 1985 in cooperation with the municipalities and local agencies. Factors such as the present significance and future potential of the resource, and the desired uses of the harbour will be used to develop the most suitable management approach.

The province investigated the extent of impact of the Ford Motor Company plant outfall at Oakville on nearshore Lake Ontario. The outfall discharges into a semi-confined region with limited lake mixing. The extent of the sewage plumes from the newly fitted Clarkson and Lakeview outfalls were also monitored to assess the extent of their impact.

The Ministry provided assistance to the City of Toronto in monitoring of bacterial water quality at major sources and at Lake Ontario/Toronto area beaches. Assessment of the effects of dredging and lakefilling activities in the vicinity of the East Headland continued; sediment traps and a transmissometer were used for turbidity-depth profiles to assess the quality and quantity of sediments moving away from the East Headland. Although the impact of suspended solids inputs on water quality tends to be localized, bed sediment data have identified zones of contamination. Sediment quality in embayments of selected lakefills (Humber Bay, Ashbridges Bay and Bluffers Park) was also investigated by the province in cooperation with the Metropolitan Toronto and Region Conservation Authority.

Improvement of municipal treatment facilities and phosphorus removal is now on line at all municipal plants in the Bay of Quinte and significant reductions in receiving water phosphorus concentrations from 1978-81 suggested a positive response to abatement measures. A recent slight increase in phosphorus and biomass concentrations (1982-84), however, the predominance of blue-green algae indicates a need for continued assessment.

Preparation continued in 1984 on a synthesis paper based on data collected from 1972-1982 on the Bay of Quinte physical and chemical limnology, phytoplankton and fisheries ("Project Quinte") by the province and cooperative agencies. The final publication is expected in 1985.

A 1981 bacteriological survey in the Bay of Quinte municipalities (Trenton, Belleville, Deseronto, Picton) by the Ministry found an extensive zone of impact related to wet weather bypassing from the Belleville Sewage Treatment Plant. Expansion of the plant capacity was completed in 1984 and the province resampled the area for bacteriological parameters. The results indicated no improvement in bacteriological quality under runoff conditions. Significant bacteriological loadings were found to originate from several storm sewers discharging to the Moira River and bay; bacterial pollution of unknown origin was found to originate from areas upstream of Belleville.

Investigations by the province in the St. Lawrence River at Maitland commenced in 1984 to assess the impact of industrial discharges (Dupont Canada's tetraethyl lead plant) on river water and sediment quality and on biota in the river. Field studies included: (1) biological monitoring of point source dischargers using clams, spottail shiners and sport fish; (2) sampling of surficial sediments in the Maitland/Ogdensburg area of the river for metals, PCBs and organochlorine pesticides. An aquatic environmental impact of the lead discharges from Dupont was found downstream of the outfall. Substantial numbers of sport fish had elevated levels of total lead in tissue; consequently MOE advised restricted consumption. Lead (total and alkyl) residues in amphipods and spottail shiners were significantly higher downstream of the outfall of total lead in sediments also indicated elevated levels downstream of the plant.

Basin Wide Great Lakes Programs

The province also maintained surveillance of water quality issues common to all the Great Lakes. The assessment of the potential hazards of selected contaminants in sediments and benthic communities at some of the Areas of Concern (Lower St. Clair River, Detroit River, Toronto waterfront and St. Lawrence River) was continued. Collections of young-of-the-year spottail shiners were taken from 38 localities throughout the Great Lakes for point-source identifications, assessment of effectiveness of remedial measures and temporal trend assessment. Nutrient and contaminant loadings for significant tributaries to the Great Lakes and phosphorus inflow/outflow loading relationships in the Great Lakes were estimated. The assessment of the effectiveness of phosphorus control programs continued through the long-term sampling of raw water from 17 municipal intakes. Surveillance was also maintained by the province on specific radionuclides from six source control areas of potential or existing radioactive releases to the Ontario coastal zone of the Great Lakes.

In 1984-85 the MOE-MNR Ontario Sport Fish Testing Program collected 1,600 edible portion samples from the Great Lakes. Fish from 172 locations in the Canadian waters of the Great Lakes were tested for their suitability for human consumption. Thirty-nine different species of fish were tested for a range of persistent substances which included mercury, PCB, mirex, DDT, lindane, chlordane, aldrin, heptachlor, hexachlorobenzene and octachlorostyrene. Selected samples were analyzed for the chlorinated dioxin 2, 3, 7, 8-TCDD and metals such as lead.

The resultant consumption advice provided in the 1985 edition of the "Guide to Eating Ontario Sport Fish" indicates that of the 502 listed advisories, only 6.6% (33) advised consumption limitations on all sizes of the species tested. At only 4.1% (7) of the 172 locations were all sizes and species of fish tested suitable only for restricted consumption.

Trend analysis continues to show the decline of mercury levels in fish from Lake St. Clair. As well, declines in PCB levels in Lake Ontario Salmonids continued. Recent tests for the chlorinated dioxin 2, 3, 7, 8-TCDD in Lake Ontario Lake trout, Rainbow trout, Brown trout, Coho salmon and Chinook salmon did not detect this substance in the edible portion.

4.5 Toxic Substances Committee

Outputs of the Toxic Substances Committee for 1984-85 include:

- the publication of a report entitled "Trace Organics in Ontario Drinking Water Along the Niagara River" which was released by the Hon. James Bradley in August of 1985;
- the conclusion of the alkyl-lead issue in St. Lawrence River fish resulting in the voluntary closure of the Dupont-Maitland facility for the manufacture of tetraethyl-lead gasoline additives;
- the beginning of a formal multi-agency hazard assessment of toxaphene in Great Lakes fish resulting from an intensive two-year period of toxicological research by the Department of National Health and Welfare parallel by the extensive monitoring of toxaphene residues in Great Lakes fish by the Department of Fisheries and Oceans, and the Ministry of Environment in Lakes throughout Ontario as well as intensive modelling and surveillance effort of long-range atmospheric as well as direct historical input sources of toxaphene into the Great Lakes and other lakes throughout Ontario; and
- further examination of the levelling off of organochlorine residue trend in Lake Ontario

Trace Organics in Ontario Drinking Water Along the Niagara River

This report was designed to complement the publication of the report of the Niagara River Toxic Substances Committee which did not include an evaluation of drinking water although potential sources and priority contaminants were identified. The report compiles the trace organics data from three water treatment plants along the Niagara River for a one-year period. The data were evaluated in light of all available guidelines, objectives and standards and the NRTC priority chemical lists. Recommendations were made for action to fill data gaps on priority chemicals requiring monitoring and for the development of the necessary background documentation for drinking water guidelines or health risk assessments where deemed necessary.

Alkyl-lead

Following an intensive program by MOE, MNR, DFO and DOE to address the extent of alkyl-lead contamination of the sport fish, benthic invertebrates, and sediments in the Maitland area discussions were held with Dupont Chemicals that were to lead to effluent loading guidelines for lead. In the spring of 1985, Dupont announced that it was shutting down its tetraethyl lead operation at Maitland. During the shut-down process, some lead will continue to enter the St. Lawrence River. In 1986, the beneficial effects of the termination of lead discharges should be seen in fish tissue residue analysis. An examination of the potential for alkyl-lead contamination of the other major Canadian tetraethyl-lead producer on the Great Lakes at Sarnia is proceeding through joint DOE and MOE studies.

Toxaphene

Since this organochlorine pesticide was first identified in Great Lakes fish throughout the Great Lakes basin the two primary activities of Canadian and Ontario agencies have been to develop a comprehensive data base for toxaphene residues in Great Lakes and inland lakes commercial and sport fish, and to develop an adequate mammalian toxicological data base, both of which are required for a hazard assessment and the development of a human health consumption guideline (see 1984 report). Health and Welfare Canada's studies were completed in 1985 after a considerable expenditure of resources and expertise. Preliminary meetings were held in 1985 towards the development of a hazard assessment and a human health guideline for the sport fishery. Discussions are continuing as more data becomes available. Surveillance of precipitation in the Lake Superior area has shown that toxaphene residues no longer occurred in samples collected during 1983 and 1984 following the further restriction of toxaphene use in the U.S.A in 1982. Although this is encouraging news, long range atmospheric transport may still be a concern because of the

commencement of production and use of toxaphene on a large scale in Mexico and Central America. Recent surveys of toxaphene residues in some Ontario inland lakes, where the chemical was used to control fish populations during the 1960's, show that the compound is extremely persistent.

Trends in Organochlorine Residues

Monitoring data on PCBs, mirex and total DDT residues in Lake Ontario commercial fish and wildlife show a continuing levelling off of declining trends and some data may be indicating a reversal to increasing trends. Trends in the sport fish data have not coincided with the international open lake monitoring. It is recommended that a close examination of Lake Ontario data be undertaken to rationalize the interpretation of the long-term data with current knowledge on sources and to obtain trend data on chlorinated dioxins as a priority.

4.6 Pollution Controls Committee

The Pollution Controls Committee met on a number of occasions throughout FY 1984/85 to discuss Committee responsibilities.

The Committee ensured that the 1983 municipal and industrial point source data including pollution abatement requirements were submitted to the IJC Regional Office in Windsor. The submission of raw computerized municipal and industrial data to the IJC was again addressed. The Committee agreed to recommend to the Board that raw data and an interpretation of the data will be given simultaneously, in future, to the IJC.

The Committee, in conjunction with the surveillance committee, initiated the coordination, the preparation and review of six preliminary Remedial Action Plans (RAPs) for:

- Spanish River
- Wheatley Harbour
- St. Mary's River
- Niagara River
- St. Clair River
- Collingwood Harbour

Reports on the developments of the RAPs were submitted to the Programs Committee of the IJC's Water Quality Board. The final reports will be completed after reviewing and incorporating WQB comments.

Environment Canada and Ministry of the Environment staff continued with reassessment of the dredge spoils disposal guidelines, including the development of bioassessment techniques. Reports on the review are being prepared and field programs are under development.

The Committee actively participated in the COA Phosphorus Management Plan.

4.7 Public Information Committee

Public Information items such as the booklet "Sweetwater Seas" Great Lakes fact sheets and buttons were reprinted and revised during the year. Displays produced by the Public Information Committee continue to be used by interest groups and the public. Refinements were made to the major COA display for viewing at the International Joint Commission water quality meeting in Kingston.

Press releases were issued to mark the transfer of federal funding to the province for the improvement of sewerage facilities in the Great Lakes basin. The Information Committee was also involved in the opening of eight municipal sewage treatment plants built with the aid of COA funds. Press releases, fact sheets and speeches were prepared for opening ceremonies.

Great Lakes Tomorrow received its final grant for a Lake Ontario program and the Phosphorus Task Force conducted public participation on its phosphorus management plan. Funding for these projects was monitored by the Information Committee.

4.8 Sewerage Facilities Construction Program

Contribution to funding for municipal sewage treatment by the federal government, under the 1971 COA, was continued through 1985 under the 1982 amendment of the Agreement. From the mid-1970's until 1980, funding was made available under the Community Services Contribution Program administered by Canada Mortgage and Housing Corporation (National Housing Act). Termination of that program left a number of sewage treatment projects incomplete. Thereafter, in order to enable Canada to continue with its obligations under the Canada-U.S. Great Lakes Water Quality Agreement, \$65 million of federal funds for the Sewerage Facilities Construction Program (Schedule G) were provided under the 1982 COA pursuant to the Canada Water Act for the 3 year period ending in 1985. The provincial contribution to municipalities under the three year program was \$153 million.

The total gross cost of the Program is currently estimated at \$412.597 million. In the first program year, ending March 31, 1983, the federal government contributed \$35.0 million, the provincial government \$67.6 million and municipal governments \$51.1 million. During the second program year, the federal government contributed \$10,241,631, of an allocation of \$20.0 million, the provincial government \$19.6 million, and the municipalities \$23.0 million. During the third program year, the federal government contributed \$10.0 million of the 10.0 million allocated; provincial government \$25.2 million; and, the municipalities \$26.0 million.

The second program year closed having a balance of \$9,785,369. The parties have agreed to extend the Sewerage Facilities Construction Program to March 31, 1987 and to reprofile the contribution as follows: 1985/86 - \$9,785,369; and 1986/87 - \$1,806,978. These funds have been allocated to projects in 23 municipalities carrying a gross cost of \$163,514,712 of which \$98,601,003 is eligible for assistance under this Program.

During 1983/84 and again during 1985/86, the federal Office of the Auditor General conducted a comprehensive audit of the federal contributions. While an audit report was not filed at this writing there are several observations involving administrative and Agreement weaknesses which must be corrected. Both Parties have reviewed the observations and have incorporated the required amendments into the new Schedule G.

Federal Contribution by type of Work - Payment Year 1984/85

| <u>TYPE</u> | <u>NEW (\$)</u> | <u>EXTENTION (\$)</u> | <u>TOTAL (\$)</u> |
|-------------|-----------------|-----------------------|-------------------|
| STP | 1,365,999 | 2,634,075 | 4,000,074 |
| SPS | 1,587,565 | 211,371 | 1,798,936 |
| SEWERS | 2,554,782 | 1,029,425 | 3,584,207 |
| LAGOONS | 194,728 | 422,055 | 616,783 |
| TOTALS | 5,703,074 | 4,296,926 | 10,000,000 |

STP = Sewage Treatment Plant

SPS = Sewage Pumping Station

5.0 1984-1985 Budget

Funds expended under the 1982 COA derive from two sources, via., (1) the sum of \$2,400,000 dollars as set out in Article VI of the Agreement, and (2) the sum of \$65,000,000 dollars as set out in Section 5 of Schedule G, "Sewerage Facilities Construction Program".

(1) Funds available from Article VI

These funds support the cost-shared activities of Canada and Ontario under the Agreement and were applied to the Public Information and Surveillance Program as follows:

| | <u>TOTAL</u> | <u>COST TO EACH PARTY</u> |
|--------------------|--------------------|---------------------------|
| Public Information | \$ 62,000 | \$ 31,000 |
| Surveillance | <u>\$2,338,000</u> | <u>\$1,169,000</u> |
| | <u>\$2,400,000</u> | <u>\$1,200,000</u> |

However, it should be noted that the full cost of nearshore surveillance undertaken by the province to fulfill Canada's responsibilities to the Canada-U.S. Great Lakes Water Quality Agreement was \$3,032,900. Thus the support provided for this program was:

| | |
|---------|-------------|
| Canada | \$1,172,750 |
| Ontario | \$1,860,150 |

(2) Section 5, Schedule G, Sewerage Facilities Construction Program

This program provides Federal contributions to the province in the amount of \$65,000,000 over a three year period to complete municipal sewerage facilities construction projects in accordance with the Canada-U.S. Great Lakes Water Quality Agreement. Contributions available to the province for transfer to eligible municipalities in FY 1984/85 (the third year of the program) amounted to \$10,000,000.

Contributions were forwarded to the province to support 79 projects in the amount of \$10,000,000, leaving an unspent balance of \$9,785,369 from the amount available. Total estimated gross cost of the work undertaken during the 3 years amounted to \$55,214,631. For various reasons municipalities have not been able to utilize the full allocation of \$65,000,00 for this program. The extension of Schedule G is presently being negotiated as part of the renewed COA.

6.0 SPECIAL PROJECTS

6.1 Renegotiations of the Canada-Ontario Agreement Respecting Great Lakes Water Quality

The 1982 COA expired on March 31, 1985. In order to ensure continuity, negotiations for a renewed COA commenced formally in December of 1984. Major issues negotiated were as follows:

1. The extension of Schedule G (Sewerage Facilities construction Program) by rolling-over and reprofiling lapsed Federal funds to dispense the Federal commitment to this program as follows:

| <u>FY</u> | <u>Proposed Federal Allocation</u> |
|-----------|------------------------------------|
| 1985/86 | \$7,978,392 |
| 1986/87 | \$1,806,977 |

2. The increase of the Federal government's contribution for nearshore surveillance, research and other activities.
3. The provision for a 50-50 cost sharing between Canada and Ontario for the implementation of the Phosphorus Management Plan including:
 - instream monitoring and evaluation of non-point phosphorus control programs in the Lake Erie Basin; and
 - technical assessments of related facilities within the lower Great Lakes in order to determine the existing design capacities and the additional costs required to lower the total phosphorus load flow to less than 1.0 mg/l.
4. The establishment of a joint program to address the 17 Canadian areas of concern identified and described by the International Joint Commission.
5. To expand the membership of the COA Board of Review from 6 to 10 to include representatives from federal and provincial agricultural agencies in recognition of the important role they play in reducing the phosphorus load from non-point sources.

6.2 Niagara River Toxics Committee

The Canada-U.S. Niagara River Toxics Committee completed its report in October, 1984, for transmittal to the sponsoring agencies and its subsequent public release on November 27, 1984. The report describes the extent of contamination in the Niagara River system and identifies major industrial and municipal sources and those hazardous waste dumpsites suspected of having a significant potential to contaminate the river. Data quality limitations restricted the interpretation of toxic chemical loading results from point sources and no estimate could be made of nonpoint contributions because of the inadequate understanding of groundwater flows and contamination in the Niagara region.

The Committee's report sets out the framework for a long-term monitoring program for the Niagara River and identifies twenty-four recommendations for the further characterization and control of toxic chemical discharges. Two of these recommendations which involve the establishment of a toxic loading allocation plan on the Niagara and progressively more restrictive objectives within the Great Lakes Water Quality Agreement were put forward by the Canadian members without the support of the American representatives.

The four participating agencies in the Niagara River study, the New York State Department of Environmental Conservation, U.S. Environmental Protection Agency, Ontario Ministry of the Environment and Environment Canada, have responded to the recommendations (February, May, September and October 1985, respectively) and identified measures and programs that have been, or will be, instituted. Bilateral discussions are continuing on cooperative planning for defining and managing toxic chemical discharges.

6.3 Upper Great Lakes Connecting Channels

The St. Mary's, St. Clair and Detroit Rivers were designated as Class A areas of concern by the International Joint Commission (IJC) in 1981. This was based on evidence of significant environmental degradation and severe impairment of beneficial uses. Although water quality in these areas has improved, persistent pollutants such as heavy metals, organochlorine pesticides and PCBs remain in the fish, sediment and water.

In his November 1983 speech to the IJC meeting in Indianapolis, Indiana, the U.S. Environmental protection Agency Administrator William Ruckelshaus announced a U.S. study on the St. Mary's, St. Clair and Detroit Rivers, including Lake St. Clair, and invited Canadian support. By February 1984, the State of Michigan, Environment Canada, Department of Fisheries and Oceans, and the Ontario Ministry of the Environment had all agreed to merge their ongoing studies and develop new programs in conjunction with the U.S. agencies.

The Purpose of the study is:

1. to facilitate the development of remedial action plans; and
2. develop a framework for understanding ecosystem-contaminant dynamics for these waterbodies.

A three-tiered management structure was formed: the Management Committee, the Activity Integration Committee and the Study Work Groups.

The responsibility of the Management Committee is to identify the issues and define the study structure, approve the study work plans, and approve the final study report for submittal to the participating agencies.

The Activity Integration Committee (AIC) consists of the chairmen of the technical work groups plus representatives of U.S. and Canadian federal and regional governments. It is responsible for preparing and overseeing implementation of the study work plan and the drafting of the final study report.

Members of the work groups are scientific technical experts from participating governmental agencies. They have major responsibilities for identifying, planning and coordinating the surveillance and research activities.

The progress of the UGLCCS has been reviewed by COA at each meeting since the inception of the study. The notable achievements in 1984/85 include:

- Seven Work Groups were formed and are operational. They are identified as follows: Biota, Modelling, Non-Point source, Point Source, Quality Management, Sediments, and Water Quality.
- Each Work Group met several times to develop a plan of activities for the 1985 field season.
- A Workshop consisting of fifty-eight scientists and professionals plus invited observers met on December 10 through the 12, 1984, in Windsor, Ontario. The Workshop was conducted by four conference leaders affiliated with Environmental and Social Systems Analysts, Ltd. (ESSA)
- Canada and Ontario retained the services of Limno-Tech Inc. to produce a literature review on the connecting channels. This was submitted in March, 1985 and was instrumental in guiding the revision of the studies work plan.
- A tentative plan for a bi-national, multi-agency data and information exchange computer was initiated.

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